Qual Life Res (2014) 23:671–678
DOI 10.1007/s11136-013-0497-3

Determinants of quality of life in Spanish transsexuals attending a gender unit before genital sex reassignment surgery

Esther Gómez-Gil · Leire Zubiaurre-Elorza · Isabel Esteva de Antonio · Antonio Guillamon · Manel Salamero

Accepted: 31 July 2013 / Published online: 13 August 2013

Abstract
Purpose To evaluate the self-reported perceived quality of life (QoL) in transsexuals attending a Spanish gender identity unit before genital sex reassignment surgery, and to identify possible determinants that likely contribute to their QoL.
Methods A sample of 119 male-to-female (MF) and 74 female-to-male (FM) transsexuals were included in the study. The WHOQOL-BREF scale was used to evaluate self-reported QoL. Possible determinants included age, sex, education, employment, partnership status, undergoing cross-sex hormonal therapy, receiving at least one non-genital sex reassignment surgery, and family support (assessed with the family APGAR questionnaire).
Results Mean scores of all QoL domains ranged from 55.44 to 63.51. Linear regression analyses revealed that undergoing cross-sex hormonal treatment, having family support, and having an occupation were associated with a better QoL for all transsexuals. FM transsexuals have higher social domain QoL scores than MF transsexuals. The model accounts for 20.6 % of the variance in the physical, 32.5 % in the psychological, 21.9 % in the social, and 20.1 % in the environment domains, and 22.9 % in the global QoL factor.
Conclusions Cross-sex hormonal treatment, family support, and working or studying are linked to a better self-reported QoL in transsexuals. Healthcare providers should consider these factors when planning interventions to promote the health-related QoL of transsexuals.

Keywords Transsexualism · Quality of life · WHOQOL-BREF · Hormonal sex reassignment therapy · Family support · Socio-demographic factors

Abbreviations

MFs	Male-to-female transsexuals
FMs	Female-to-male transsexuals
QoL	Quality of life
WHOQOL	World Health Organization quality of life scale
APGARq	Family APGAR Questionnaire
SR	Sex reassignment

Introduction

Gender identity disorder or gender dysphoria is a condition in which persons experience discrepancy between the sex assigned at birth and the gender they identify with, often leading to extensive personal distress. Transsexualism is considered the most extreme form of gender dysphoria, and the term transsexual is typically used to describe

E. Gómez-Gil (✉)
Institute Clínic of Neurosciences, Department of Psychiatry, Servicio de Psiquiatría, Hospital Clinic, IDIBAPS, Villarroel 170, 08036 Barcelona, Spain
e-mail: esgomez@clinic.ub.es

L. Zubiaurre-Elorza
Department of Psychiatry and Clinical Psychobiology, University of Barcelona, Barcelona, Spain

I. Esteva de Antonio
Department of Endocrinology, Hospital Carlos Haya, Malaga, Spain

A. Guillamon
Department of Psychobiology, Psychology Faculty, UNED, Madrid, Spain

M. Salamero
Institute Clinic of Neuroscience, Department of Psychology, Hospital Clinic, IDIBAPS, Barcelona, Spain

individuals who seek cross-sex hormone therapy and sex reassignment (SR) surgery to align their self-identification of gender with their physical characteristics. Transgenderism is an umbrella term for persons whose gender identity, expression, or behaviour does not conform to that typically associated with the sex to which they were assigned at birth, regardless of whether or not they received medical or surgical treatment. The term transgender incorporates transsexuals, cross-dressers, and other individuals with a lower degree of gender dysphoria [1].

Transgender individuals (mainly transsexual subjects) face psychological, familial, social, and economic difficulties that compromise their quality of life (QoL). QoL is one of the essential aspects of human health, which is embedded in a psychological, physical, social, and environmental context. The World Health Organization (WHO) defines QoL as 'an individual's perception of their position in life in the context of the culture and value systems in which they live, and in relation to their goals, expectations, standards, and concerns' (WHOQOL Group 2004) [2]. Moreover, the WHOQOL Group takes the view that QoL is highly individual and subjective.

So far, little research has been conducted using standardized instruments to measure QoL of individuals with gender dysphoria. Only a few studies have assessed QoL in individuals from the USA [3, 4], Belgium [5–7], Switzerland [8], France [9, 10], and Spain [11], and only one study evaluated QoL in adolescents from the Netherlands [12]. Overall, most previous studies reported that the QoL of transsexual or transgender subjects is less favourable than the QoL of the general population [3, 4, 6–8]. However, a few studies found that the QoL of adult [5, 7] and adolescent transgenders and transsexuals [12] was comparable with the QoL of the reference samples.

Several follow-up studies of transsexuals have shown that SR, consisting of cross-sex hormonal treatment and SR surgery (facial and/or genital), is an effective treatment and has been associated with favourable changes in many aspects of the individual's life, including feelings of gender dysphoria, self-esteem, psychological well-being, social relationships, sexual life, and global satisfaction with life [13–15]. Nevertheless, very little data are available using well-validated measures of QoL [3–12], and focusing on the impact of the variables that are linked to this QoL. To the best of our knowledge, only the study of Gorin-Lazard et al. [10] assessed possible predictors of QoL in a sample of 32 male-to-female (MF) and 30 female-to-male (FM) transsexuals included in a SR protocol followed by a gender team. They found that two variables, hormonal therapy and depression, were independent predictive factors of QoL. No relationships were found between QoL and gender, partnership status, employment status, having children at home, and sexual orientation. Newfield et al. [3] have also found in a sample of 446 FM transgenders recruited to an Internet site that participants who received testosterone reported higher QoL than those who did not receive hormone therapy. The remaining QoL studies of transsexuals have documented the potential impact of surgical treatments (facial feminization surgery or genital SR surgery) in transsexuals [4–8] and overall found that SR surgery improves QoL. Other socio-demographic and social variables have also been examined. In a study of gender dysphoric adolescents, De Vries et al. [12] found that FM subjects were less satisfied and reported a poorer QoL than MF individuals; moreover, poorer peer relations at the time of first attendance in the gender unit correlated with a lower score on the physical domain, and more intelligence correlated with a higher score on the environment domain of QoL. Additionally, depression has been associated with a lower QoL [10], while having a partner has a positive effect on the experienced QoL of transsexuals [5–7].

In measuring QoL, the WHOQOL Group takes the view that it is important to know how satisfied or bothered people are by important aspects of their life. Hence, the group has developed the WHOQOL-Bref QoL instrument [16]. This instrument might be well suited to evaluate QoL in transsexuals due to its widespread use in clinical settings. Nevertheless, to our knowledge, this instrument has only been used in adolescent transsexuals [12]. Studies of adult transsexuals have used mainly the Short Form 36 [3–7, 9, 10], the King's Health Questionnaire [8], and the QoL index [11].

In summary, there is a lack of studies involving QoL of transsexuals in different stages of the SR process. Moreover, there is little information about the main associations between socio-demographic and clinical factors and the QoL of transsexuals. Therefore, the aims of this study were (1) to evaluate the self-reported health-related QoL in a large sample of Spanish transsexuals without genital SR surgery attending a gender unit managed by a multidisciplinary team and (2) to ascertain whether socio-demographic, SR, and familial variables are significant determinants of perceived QoL. Based on the number of difficulties transsexuals must solve before SR [1], we hypothesized that transsexuals will report a poor QoL. We further hypothesized that being on cross-sex hormonal treatment will be associated with better perceived QoL [3, 10].

Methods

Participants and procedures

Sample

A sample of 277 transsexuals recruited at the Identity Gender Unit of the Clinic Hospital of Barcelona (Spain)

were invited to participate in a cross-sectional, descriptive study. This public hospital is the only centre providing specialized psychiatric, psychological, endocrine, and surgical treatment for transsexual patients in Catalonia (Spain) [17, 18]. Gender identity disorders in adolescents or adults (302.85) or transsexualism (F64.0) were diagnosed according to the diagnostic and statistical manual, fourth-edition text revision [19], and the International Classification of Diseases, tenth revision [20], respectively. For all cases of transsexualism included in this report, two experts on gender identity disorder management, a psychologist and a psychiatrist, agreed on the diagnosis. The assessment was performed using a combination of unstructured and semi-structured interviews and psychometric scales, and both professionals conducted the evaluation independently of one another. All participants were included in a standardized SR procedure [21] following the agreement of the multidisciplinary health professionals working on the gender reassignment unit. The unit at the time of the study adopted the standards of care guidelines of the World Professional Association for Transgender Health [22]. The present study is part of a larger research project with a focus on depression, anxiety, social phobia [23], personality [24], and QoL in Spanish transsexuals.

The study was proposed to each consecutive eligible subject during a routine visit. All subjects were informed that the purpose of the study was to investigate their perceived QoL. Written informed consent was obtained from all subjects, adults and adolescents, and from at least one parent of an adolescent. Participants were not paid for taking part in the study. The study was approved by the Ethics Committee of the Hospital and was conducted in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

Measures/instrument

The WHOQOL-BREF QoL instrument Quality of life was measured using the WHOQOL-BREF [16], Spanish version [25]. This instrument is an abbreviated 26-item version of the WHOQOL-100 questionnaire. The WHOQOL-BREF has 24 questions representing four domains related to QoL: physical (physical health and functional status, 7 items), psychological (psychological well-being, 6 items), social relationships (personal relationships and social support, 3 items), and environment (living circumstances including access to services, 8 items). It also includes two general questions covering global QoL and general health. Each item uses a 5-point Likert scale. Items inquire 'how much', 'how completely', how often', 'how good', or 'how satisfied' the respondent felt in the last 2 weeks. The word anchors for each question differ and may be based on satisfaction–dissatisfaction or amount or frequency. Each item is scored from 1 to 5, with 1 representing the least positive response and 5 the most positive, e.g. not at all (1) and completely (5). Domain scores were calculated from the mean score of items within the domain. The raw scores were transformed on a scale from 0 to 100 to enable comparisons between domains composed of unequal numbers of items; 0 is the worse QoL score, and 100 is the best QoL score for all domains.

For the purpose of summarizing the meaning of the mean scores of items within the domains, in the 'Discussion' section, the term 'normal' QoL is applied to a mean domain score of 50 and 'quite good' QoL is used for domain scores at or over 75. If two or more items were missed in the psychological, physical, and environment domains, and one item in the social domain, the domain was not scored. The Spanish version has good internal consistency (*Cronbach's alpha* = .66–.84), discriminant validity between patients and controls (r = .89–.95), and sufficient test–retest reliability (r = .56–.84) [27].

Studied variables

We selected from the clinical records the most determinant variables for QoL based on previous studies' findings [3–8, 10, 12].

Socio-demographic and clinical variables Age, sex, educational level, occupation, whether or not they have a partner, whether or not they are at the current moment undergoing cross-sex hormonal treatment, and whether they have received any SR surgery were asked of the participants during their evaluation and were confirmed with the data available on the clinical record. Patients undergoing cross-sex hormonal treatment include transsexuals that at the moment of the evaluation were receiving hormonal treatment (whatever the length of treatment) and were under a SR protocol [21]. This group includes both transsexuals with cross-sex hormones always prescribed by the endocrinologist and patients who started taking hormones before they were under a physician's prescription control in our unit. Education level was grouped into two categories: (a) primary and non-concluded secondary and (b) concluded secondary and/or university. Occupation was grouped into two categories: (a) non-student or unemployed and (b) student or working. The variables to have a partner at present, to have undergone hormonal treatment, and to have received at least one SR surgery were grouped into two categories (no/yes). Patients who had genital SR surgery (vaginoplasty and orchiectomy in MF, or phalloplasty in FM transsexuals) were excluded from the whole study.

Familial variable Family functionality as perceived by the transsexuals was evaluated with the Spanish version of

the Family APGAR Questionnaire (APGARq) [26, 27]. This questionnaire rates satisfaction with family relations and distinguishes five components of family function: adaptability, partnership, growth, affection, and resolve. It consists of five questions with three possible answers: 0 ('hardly ever'), 1 ('sometimes'), and 2 ('always'). The total score range varies from 0 to 10, meaning the higher the total score, the better is family functioning. A global score of 7 points or more indicates family functionality, while a score of less than 7 points indicates family dysfunction. The questionnaire was self-administered and completed by the patients at the same time as the WHOQOL-BREF. The validation of the Spanish version has good internal consistency (*Cronbach's alpha* = .84), external validity related to socio-demographic indexes (OR 2.00–12.97), and sufficient test–retest reliability ($r = .75$) [27].

Statistical analyses

All analyses were conducted using Predictive Analytics SoftWare Statistics 18.0. Data distributions were checked for parametricity by the Kolmogorov–Smirnov test. The socio-demographic and clinical variables were analysed using descriptive statistics. Means and standard deviation were calculated for continuous variables, and frequencies and percentages were generated for nominal and categorical variables. A linear regression model with *enter* method for each domain was performed to estimate which variables are associated with QoL. The WHOQOL-BREF summary score and the domain scores were used as dependent variables. Significance level was set at 5 % ($p < 0.05$).

Results

Sample description

Of the 277 patients who were invited to participate in this cross-sectional study, 260 (92 %) agreed to participate and completed the questionnaires. From this sample, the most common reasons for excluding participants were incomplete answers to the scales ($n = 59$) and previous genital SR surgery [$n = 8$ (4 vaginoplasties and 2 orchiectomies in MFs and 2 phalloplasties in FM transsexuals)]. Therefore, our final sample consisted of 193 transsexual patients. The socio-demographic characteristics of this sample are presented in Table 1.

Table 1 Description of socio-demographic, clinical (hormonal and surgical SR), and familial characteristics of a Spanish transsexual sample

Characteristics of the sample	Transsexuals ($n = 193$)
Age	Mean (SD); range
	31.2 years (SD = 9.9); 16–67 years
Sex	*N* (%)
Male-to-female	119 (61.7 %)
Female-to-male	74 (38.3 %)
Education level	
Up secondary	80 (41.5 %)
Below secondary	113 (58.5 %)
Work or student status	
Studying or working	118 (61.1 %)
Non-student or unemployed	75 (38.9 %)
Partnership status	
Yes	53 (27.5 %)
No	140 (72.5 %)
Under hormone therapy	
Yes	120 (62.2 %)
No	73 (37.8 %)
At least one previous SR surgery	
Yes	80 (41.5 %)
No	113 (58.5 %)
Male-to-female ($n = 119$)	
At least one non-genital MF surgery	51 (42.9 %)
Mammoplasty augmentation	47 (39.50 %)
Facial feminization surgery	11 (9.24 %)
Buttocks feminization surgery	9 (7.56 %)
Thyroid chondroplasty	2 (1.68 %)
Female-to-male ($n = 74$)	
At least one non-genital FM surgery	29 (39.2 %)
Breast reduction/mastectomy	29 (39.2 %)
Hysterectomy	19 (25.68 %)
APGAR family score	Mean (SD); range
	7.23 points (SD = 2.86); 0–10
APGAR family score $\geq$ 7 points	*N* (%)
	129 (66.8 %)

The WHOQOL-BREF

The descriptive data for the WHOQOL-BREF are presented in Table 2. Overall QoL and domain means (physical, psychological, social, and environmental, and global perception) range from 55.44 to 63.51.

Regression analysis for possible determinants of QoL

The results of the regression model of the eight possible determinants and the five QoL domains are shown in Table 3. The model accounts for 20.6 % of the variance in

Table 2 Descriptive statistics for QoL domains and global QoL and health factor in Spanish transsexuals ($n = 193$)

	QoL score		QoL score ≤ 25
	Mean (SD)	Range	*N* (%)
Physical domain	63.51 (17.79)	(14.29–100)	7 (3.6 %)
Psychological domain	56.09 (16.27)	(16.67–56.09)	10 (5.2 %)
Social domain	60.35 (21.88)	(8.33–100)	15 (7.8 %)
Environmental domain	58.81(14.89)	(12.50–96.88)	5 (2.6 %)
Global (QoL and health) factor	55.44 (27.18)	(0–100)	43 (22.3 %)

For the WHOQOL-BREF: 100 is the best QoL score; 0 is the worst QoL score

Table 3 Regression analysis (enter method) for possible determinants of QoL in Spanish transsexuals

Determinant variables	Quality of life domains				Quality of life factor Global QoL and health
	Physical	Psychological	Social	Environmental	
	R^2 = .206	R^2 = .325	R^2 = .219	R^2 = .201	R^2 = .229
	$F_{(8,192)} = 5.955$***	$F_{(8,192)} = 11.090$***	$F_{(8,192)} = 6.443$***	$F_{(8,\ 192)} = 5.786$***	$F_{(8,192)} = 6.819$***
	β	β	β	β	β
Age	0.14	0.009	0.013	0.007	−0.29
Sex (female-to-male)	0.100	−0.005	0.193**	−0.044	0.126
Education (secondary)	−0.081	−0.004	0.014	0.052	0.083
Working/studying status (yes)	0.199**	0.020	0.164*	0.186**	0.185**
Partnership status (yes)	0.037	0.095	0.008	−0.056	0.125
Hormone therapy (yes)	0.202*	0.443***	0.248**	0.158	0.191*
Sex reassignment surgery (at least one surgery) (yes)	−0.019	0.112	0.042	0.058	0.116
Family support	0.314***	0.133*	0.280***	0.310***	0.248**

β Standardized beta coefficient, *F F* test; R^2 multiple *R*

* Significant at the level $p < .05$; ** significant at the level $p < .01$; ** significant at the level $p < .001$

the physical domain, 32.5 % for the psychological domain, 21.9 % in the social domain, 20.1 % in the environment domain, and 22.9 % in the global QoL factor. Having family support, undergoing cross-sex hormonal treatment, and having an occupation (working or student) contributed significantly to almost all domains and to the global factor (Table 3). Hormonal treatment was not a significant determinant of the environment domain ($p = 0.061$), nor was occupation for the psychological domain. The MF group is associated with worse social QoL than the FM group. The variables age, educational level, relationship status, and previous SR surgery were not associated with any QoL domain.

Discussion

The main results of this study suggest that the perceived QoL of Spanish transsexuals ranks from 'normal' to 'quite good' and was better mainly for those who received hormonal SR treatment, had better family support, and had an occupation.

In contrast to our hypothesis, the first relevant finding is that overall Spanish transsexuals attending the gender unit perceived their QoL between 'normal' and 'quite good' (mean domain scores from 50 to 75). This result is in line with previous research on transsexuals that observed that the QoL in adults and adolescents was 'rather good' [3, 4, 8, 10, 12]. Nevertheless, Spanish transsexuals reported diminished perceived QoL compared with a Spanish sample of 101 healthy subjects, in which all domains exceeded the scalar point of 75 [25]. When other researchers compare data with data obtained from normative samples or controls, some studies [3, 6–8], but not all [5, 8, 10, 12], found that transsexuals seem to report diminished QoL levels. Our study might be comparable to the studies whose samples are composed of transsexuals who have not yet had genital SR surgery [3, 10, 11], but not with studies that include post-operative transsexuals [4–8]. Interestingly, the QoL of our sample, in concordance with the French sample [10], overall, was perceived as 'normal' to 'good'. One explanation for these favourable overall QoL results may be that the initiation of the SR process per se (to participate in a controlled protocol implemented by a multidisciplinary

gender team in the health system) is the key factor in improving QoL before hormonal treatment. Unfortunately, the results may not extend to transsexuals from our region that do not have information about the gender unit and the possibilities of initiating SR treatment, or transsexuals from other Spanish autonomous communities [18] or countries that do not offer public health treatment to these patients. In these latter subjects, their perceived QoL may be poor.

The second relevant finding is that one clinical variable (hormonal treatment), one social variable (family support), and one demographic variable (working or studying) showed significant association with QoL. In accordance with our hypothesis, hormonal treatment plays an important role in all dimensions of QoL in transsexuals except for the environmental domain. This result is consistent with both the literature on QoL [3, 10, 11] and previous general research [13–15]. Nevertheless, only the Gorin-Lazard et al. study [10] and ours have analysed hormonal treatment as a determinant of QoL in transsexuals that have not undergone genital SR surgery and measured socio-demographic factors.

The second clinical variable analysed, at least one previous SR surgery, was not related to QoL. Several studies of transsexuals have documented the potential impact of surgical SR treatments on QoL of transsexual and transgendered persons [4–8]. Ainsworth and Spiegel [4] found that transgender MFs who had surgical feminization (either facial feminization or genital SR surgery) had significantly higher QoL compared to their non-surgical counterparts and were similar to the general population. While not conclusive of a direct effect, their results suggest the possibility that feminizing surgery can positively impact the QoL of transgender MFs. Weyers et al. [5] and Motmans et al. [7] also found that MF transsexuals, most with genital SR (vaginoplasty), did not significantly differ from the general female reference population on QoL. In contrast, Kuhn et al. [8] found that 15 years after genital SR surgery, QoL in transgender MF was lower in the domains of general health, role limitation, and in general life satisfaction, compared with controls. In FM transsexuals, Motmans et al. [7] and Wierckx et al. [6], using the Short Form 36, found significantly diminished QoL scores in two of the eight scales (vitality and mental health), when compared with a general sample of men. Their samples included individuals who have undergone phalloplasty (68 and 94 %, respectively). Nevertheless, our study is not totally comparable with the previous ones [4–8] since our sample did not include transsexuals who have undergone genital SR surgery. Moreover, since in our sample most of the patients who received at least one SR surgery are on hormonal treatment (94 %), our model does not permit us to evaluate the specific contribution of both variables, hormonal and surgical treatment, individually. A new design with a new group of patients without hormonal therapy and with SR surgery (genital or not) would be necessary to clarify this point. Nevertheless, such patients will rarely be found from patients who are attending a gender unit since the care guidelines for these patients recommend cross-sex hormonal treatment before SR surgery [22, 31].

Family support also plays an important role when it comes to explaining the QoL of our sample. The Family APGARq scores suggested that greater perceived family support was related to better perceived physical, psychological, social, and environmental well-being of transsexuals. To our knowledge, the perception of family support in transsexuals and its role in their QoL has not been previously analysed. In the study of de Vries et al. [12] with dysphoric adolescents, poorer peer relations at the time of first attendance at the gender identity clinic correlated with lower QoL after their SR surgery. Interestingly, the Family APGARq showed that two-thirds (66.8 %) of Spanish patients in the process of transitioning to the other sex perceived good family functionality or family support.

To be working or studying (to be occupied) was also an important factor associated with physical, social, environmental, and global QoL. Motmans et al. [7] found that MF and FM transgender persons who were employed scored better on physical functioning, role-physical limitations, bodily pain, general health, and role limitations due to emotional problems, compared with unemployed transgender people. In our sample, a high percentage of patients (38.9 %) did not have an occupation (job or student). In recent years, joblessness has become a common and serious problem in the Spanish general population, which might explain the great importance of this factor in transsexuals. Future studies should also explore the clinical impression of the gender team that transsexuals have more problems finding a job than the general population, mainly during the gender transition period [1].

Female-to-male transsexuals were more likely to experience better QoL than MF transsexuals, but only in the social domain. Parola et al. [9] documented higher QoL in FM compared with MF transsexuals after SR surgery. In contrast, Gorin-Lazard et al. [10] did not find an association between sex and QoL. Moreover, De Vries et al. [12] found that FM dysphoric adolescents reported a poorer psychological QoL compared with the MF group; the authors concluded that this might be explained by the fact that most of the FM transsexuals had not received phalloplasty, but most of the MF had received vaginoplasty. Motmans et al. [7] found that transgender MF subjects scored lower than the FM group on the subscales physical functioning and general health, but scored better on the subscale bodily pain. Thus, our results are not comparable with studies that included transsexuals with genital SR surgery [4–8] and with those that used a different

instrument to assess QoL [3–11]. Nevertheless, our result of a better social QoL in FM transsexuals is in line with our clinical impression and with other research [1, 28], concluding that this group is employed in more stable jobs, presents a less marked psychopathology, and has better social acceptance than MF transsexuals.

Age, level of education, and partnership status, in accordance with the French study [10], were not linked to QoL in our study. In contrast, previous research reported higher QoL in transsexuals with a higher level of education [7] or involved in a relationship [5, 6, 10], and poorer QoL in transsexuals with advanced age [7, 13]. Nevertheless, only our study and the French study [10] analysed the contribution of several variables using a multivariate approach. Overall, undergoing hormonal treatment, having family support, and having an occupation are more linked to QoL of transsexuals than other socio-demographic factors such as age, educational level, and partnership status.

The strength of this study lies in the following contributions regarding the QoL of transsexual patients. The study supported the importance of hormonal treatment and was the first to examine the impact of family factors on QoL of transsexuals. In addition, this study evaluated, with the French study [10], the contribution of several determinants of QoL in transsexuals before genital SR surgery.

This study has some limitations. First, the cross-sectional design explores associations but does not allow inference of causality. Second, the study lacks a control group. Nevertheless, our data, in line with previous studies [3–8, 10, 12], compared the QoL of transsexuals to that of healthy Spanish subjects. Third, partnership status is a poorly specified variable; length or satisfaction with the quality of the relationship is not evaluated. Fourth, the role of other possible determinants, such as anxiety and depression, personality, sexual orientation, income, and occupation level, was not explored in the current study. Anxiety and depression were not included because in the previous studies with the same sample both variables did not reach clinically significant levels [23]. Sexual orientation was not included because as described previously, most of the samples' sexual orientation is towards the same anatomical sex [23, 29]. Moreover, the sample size limited the extent of the analyses, since regression models would not have been sufficiently powered for many other possible determinants to be included. According to a priori power analysis, a sample size of 160 is sufficient for detecting moderate effect sizes with alpha = .05 and power of .95 when eight independent variables are introduced in the analysis. Moreover, a ratio of 20 cases per independent variable is a parsimonious choice [30]. Fifth, the majority of participants who underwent at least one previous SR surgery were taking hormones. Thus, it is difficult to disentangle the effect of each of these variables. Finally, since the participants were transsexuals attending a gender unit, it is uncertain whether these results can be applied to transsexuals who did not attend a gender unit. We hypothesized that QoL of transsexuals who never had received medical attention or those that are taking hormones without prescription may experience a poorer QoL than patients attending a gender unit. Future research should explore these hypotheses.

In conclusion, transsexuals attending a Spanish gender unit reported 'normal' to 'quite good' QoL. Moreover, undergoing cross-sex hormonal reassignment treatment, having family support, and having an occupation proved to be significant contributors to QoL in transsexuals. Therefore, our findings suggest that any intervention aimed at improving the transsexual's QoL needs to provide health services that include hormonal treatment and interventions designed to improve family support in order to increase patients' subjective well-being.

Acknowledgments This study was supported by the Spanish Ministerio de Igualdad (MI), Instituto de la Mujer, grant IMG2009-PI040964, Ministerio de Economía e Innovación, grant PSI2011-24496, and Junta de Andalucía (JA) grant PI-0254/2007. Leire Zubiaurre-Elorza holds a fellowship from the Ministerio de Educación y Ciencia, AP2008-00935.

References

1. Gómez-Gil, E., & Esteva de Antonio, I. (2006). *Ser Transexual*. Barcelona: Editorial Glosa. ISBN 84-7429-267-0.
2. WHOQOL group. (2004). The World Health Organization's WHOQOL-BREF quality of life assessment: Psychometric properties and results of the international field trial. A Report from the WHOQOL Group. *Quality of Life Research, 13*, 299–310.
3. Newfield, E., Hart, S., Dibble, S., & Kohler, L. (2006). Female-to-male transgender quality of life. *Quality of Life Research, 15*, 1447–1457.
4. Ainsworth, T. A., & Spiegel, J. H. (2010). Quality of life of individuals with and without facial feminization surgery or gender reassignment surgery. *Quality of Life Research, 19*, 1019–1024.
5. Weyers, S., Elaut, E., De Sutter, P., Gerris, J., ŤSjoen, G., Heylens, G., et al. (2009). Long-term assessment of the physical, mental, and sexual health among transsexual women. *The Journal of Sex Medicine, 6*, 752–760.
6. Wierckx, K., Van Caenegem, E., Elaut, E., Dedecker, D., Van de Peer, F., Toye, K., et al. (2011). Quality of life and sexual health after sex reassignment surgery in transsexual men. *The Journal of Sex Medicine, 8*, 3379–3388.
7. Motmans, J., Meier, P., Ponnet, K., & ŤSjoen, G. (2012). Female and male transgender quality of life: socioeconomic and medical differences. *The Journal of Sex Medicine, 9*, 743–750.
8. Kuhn, A., Bodmer, C., Stadlmayr, W., Kuhn, P., Mueller, M. D., & Birkhauser, M. (2009). Quality of life 15 years after sex reassignment surgery for transsexualism. *Fertility and Sterility, 92*(5), 1685–1689.
9. Parola, N., Bonierbale, M., Lemaire, A., Aghababian, V., Michel, A., & Laçon, C. (2010). Study of quality of life for transsexuals

after hormonal and surgical reassignment [Etude de la qualité de vie chez des transsexuels après réassignation sexuelle]. *Sexologies, 19*, 58–63.
10. Gorin-Lazard, A., Baumstarck, K., Boyer, L., Maquigneau, A., Gebleux, S., Penochet, J. C., et al. (2012). Is hormonal therapy associated with better quality of life in transsexuals? A cross-sectional study. *The Journal of Sex Medicine, 9*, 531–541.
11. Hurtado Murillo, F., Gómez Balaguer, M., & Donat Colomer, F. (2006). Transexualismo: Reasignación de sexo y calidad de vida [Transsexualism: sex reassignment and quality of life. *Sexología Integral, 3*(1), 25–34.
12. de Vries, A. L., Steensma, T. D., Wagemaar, E. C. F., Doreleijers, T. A. H., & Cohen-Kettenis, P. T. (2011). Puberty suppression followed by cross-sex hormones and gender reassignment surgery: A Prospective follow-up of gender dysphoric adolescents into adulthood. In A. De Vries (Ed.), *Gender dysphoria in adolescents* (pp. 91–106). Amsterdam: VU University Medical Center.
13. Murad, M. H., Elamin, M. B., Garcia, M. Z., Mullan, R. J., Murad, A., Erwin, P. J., et al. (2010). Hormonal therapy and sex reassignment: A systematic review and meta-analysis of quality of life and psychosocial outcomes. *Clinical Endocrinology, 72*, 214–231.
14. Smith, Y. L., Van Goozen, S. H., Kuiper, A. J., & Cohen-Kettenis, P. T. (2005). Sex reassignment: Outcomes and predictors of treatment for adolescent and adult transsexuals. *Psychological Medicine, 35*, 89–99.
15. Kreuker, B. P., & Cohen-Kettenis, P. T. (2011). Puberty suppression in gender identity disorder: The Amsterdam experience. *Nature Reviews Endocrinology, 7*, 466–472.
16. Skevington, S. M., Lotfy, M., & ÓConnell, K. A. (2004). The World Health Organizatioṅs WHOQOL-BREF quality of life assessment: psychometric properties and results or the international field trial. A report from the WHOQOL group. *Quality of Life Research, 13*(2), 299–310.
17. Gómez-Gil, E., Esteva de Antonio, I., Almaraz, M. C., Godás Sieso, T., Halperin Rabinovich, I., et al. (2011). La demanda de asistencia sanitaria en las unidades de identidad de género de Andalucía y Cataluña durante el período 2000 a 2009. [The demand for health care services in the gender identity units of Andalusia and Catalonia during the period of 2000 to 2009]. *Revista Clínica Española, 211*, 233–239.
18. Esteva de Antonio, I., Gómez-Gil, E., Almaraz, M. C., Martínez-Tudela, J., Bergero, T., Olveira, G., et al. (2012). Organization of healthcare for transsexual persons in the Spanish national health system. [Organización de asistencia a la transexualidad en el sistema sanitario público español]. *Gaceta Sanitaria, 26*, 203–209.
19. American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders (4th ed. Text Revision (DSM-IV-TR)*. Washington, DC: American Psychiatric Association.
20. World Health Organization. (2002). *Defining Sexual Health*. Geneva, Switzerland: Report of a technical consultation of sexual health.
21. Moreno-Pérez, O., & Esteva de Antonio, I. (2012). Guías de práctica clínica para la valoración y tratamiento de la transexualidad [clinical practice guidelines for assessment and treatment of transsexualism. SEEN identity and sexual differentiation group (GIDSEEN)]. *Endocrinología y Nutrición, 59*(6), 367–382.
22. Meyer, W., Bockting, W., Cohen-Kettenis, P., Coleman, E., DiCeglie, D., Devor, H., et al. (2001). The Harry Benjamin gender dysphoria association's standards of care for gender identity disorders, sixth version. *Journal of Psychology and Human Sexuality, 13*(1), 1–30.
23. Gómez-Gil, E., Zubiaurre-Elorza, L., Esteva, I., Guillamón, A., Godás, T., Almaraz, M. C., et al. (2011). Hormone-treated transsexuals report less social distress, anxiety and depression. *Psychoneuroendocrinology, 37*(5), 662–670.
24. Gómez-Gil, E., Gutiérrez, F., Cañizares, F., Zubiaurre-Elorza, L., Monràs, M., Esteva de Antonio, I., et al. Temperament and character in transsexuals. Psychiatry Research (In press).
25. Lucas-Carrasco, R. (1998). *Versión Española del WHOQOL*. Madrid: Editorial Ergón.
26. Smilkstein, G. (1978). The family APGAR: A proposal for family function test and its use by physicians. *Journal of Family Practice, 6*, 1231–1239.
27. Bellón Saameño, J. A., Delgado Sánchez, A., Luna del Castillo, J. D., & Lardelli Claret, P. (1996). Validity and reliability of the family Apgar family function test. [Validez y fiabilidad del cuestionario de función familiar Apgar-familiar]. *Atención Primaria, 18*(6), 289–296.
28. Michel, A., Mormont, C., & Legros, J. J. (2001). A psycho-endocrinological overview of transsexualism. *European Journal of Endocrinology, 45*, 365–376.
29. Gómez-Gil, E., Trilla, A., Salamero, M., Godás, T., & Valdés, M. (2009). Socio-demographic, clinical, and psychiatric characteristics of transsexuals from Spain. *Archives of Sexual Behavior, 38*, 378–392.
30. Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analysis using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods, 41*, 1149–1160.
31. Coleman, E., Bockting , W., Botzer, M., et al. (2012). Standards of care for the health of transsexual, transgender, and gender-nonconforming people, version 7. *International Journal of Transgenderism, 13*, 165–232.